Check List 9(6): 1548–1551, 2013
© 2013 Check List and Authors
ISSN 1809-127X (available at *www.checklist.org.br*)

Check List
Journal of species lists and distribution

NOTES ON GEOGRAPHIC DISTRIBUTION

Three new records of *Pristimantis* (Amphibia: Anura: Craugastoridae) for Brazil and a comment of the advertisement call of *Pristimantis orcus*

Jhon J. López-Rojas [1*], Werther Pereira Ramalho [1], Monik da Silveira Susçuarana [1] and Moisés Barbosa de Souza [2]

1 Universidade Federal do Acre, Programa de Pós-Graduação em Ecologia e Manejo de Recursos Naturais. BR346, Km04. CEP 69915-900. Rio Branco, AC, Brazil.
2 Universidade Federal do Acre, Centro de Ciências Biológicas e da Natureza, Laboratório de Herpetologia (HerPet). BR346, Km04. CEP 69915-900. Rio Branco, AC, Brazil.
* Corresponding author. E-mail: *lopezrojasjj@gmail.com*

ABSTRACT: We report *Pristimantis achuar*, *Pristimantis delius*, and *Pristimantis orcus* as three new records from Brazil, extending their known geographic distributions from Ecuador, Colombia, and Perú. Additionally we comment on the vocalizations of *Pristimantis orcus*.

There are 6200 species of anuran amphibians described world-wide (Frost 2013). In Brazil, 946 species have been recorded, with 32 from the *Pristimantis* genus (Segalla *et al.* 2012). The family Craugastoridae has a broad distribution, ranging from Southern Arizona to central Texas (USA) and Mexico south through tropical and subtropical habitats through Colombia and Venezuela to the Guianas; south through Ecuador, Andean and Amazonian Peru and Bolivia and the Amazon drainage of Brazil, south along the eastern slopes of the Andes to northeastern Argentina; Atlantic coastal forest of southeastern Brazil (Hedges *et al.* 2008; Frost 2013).

From the species reported here, *Pristimantis achuar* is in the Amazonian evergreen lowlands of Ecuador in Napo, Orellana, and Pastaza provinces, but more widely distributed into northern Peru (Ortega-Andrade and Valencia 2012; Elmer and Cannatella 2008). *Pristimantis delius* is known from the Amazonian lowlands of the Tigre and Corrientes Rivers in extreme northern Loreto Department, Peru (Duellman and Mendelson 1995), and adjacent Ecuador (Yañez - Muñoz and Venegas 2007), from Juyuintza – Pastaza province (Ortega-Andrade and Valencia 2012) to Napo province (Rodriguez *et al.* 2004); while *Pristimantis orcus* is known only from three localities in Loreto and one in San Martin in northeastern Amazonian Peru but is likely to be found in Ecuador and Colombia (Lehr *et al.* 2009). In Brazil, however, there is little information on the distributions of species of *Pristimantis* (Souza 2009), since few people have the necessary taxonomic expertise to identify *Pristimantis* to the species level (due to high intraspecific variation and lack of taxonomic training on live and fixed specimens). Consequently there is little information on population trends, distribution, and diversity (Guayasamin and Funk 2009). The present study documents the first records of *Pristimantis achuar*, *Pristimantis delius*, and *Pristimantis orcus* for Brazil, and also presents an analysis of the advertisement call of *Pristimantis orcus.*

The three species of *Pristimantis* were found during the *Field Ecology–2012* course at the Federal University of Acre in a white sand area with Campinarana Vegetation (Daly and Silveira 2008) and dense forest with abundant *Lepidocaryum tenue* (caranaí) (Daly and Silveira 2008), in Cruzeiro do Sul, Acre Brazil. (07°32'98" S, 72°39'26.6" W, 214 m; Figure 1). We report the presence of *Pristimantis achuar*, *P. delius*, and *P. orcus* in Brazil:

Pristimantis achuar was captured (UFAC 6052, 25.2 mm SVL; Figure 2A) on 04 December 2012 at 22:33 h perched on a leaf at a height of 1.27 m above ground level in Campinarana Vegetation. This specie was previously found by Moisés Barbosa, but was specimens misidentified at that time as *Pristimantis altamazonicus* (UFAC 4194, 13.8 mm SVL) on 2000 in the region of the Reserva Extrativista Alto do Jurua – Tejó River Mouth (09°03'15" S, 72°44'20.6" W, 230 m) and as *P. ockendeni* (UFAC 892, 21.4 mm SVL) on 1994 in Reserva Extrativista Alto do Jurua – Caminho Colocação Campos Elíseos (08°56'35" S, 72°27'58" W, 192 m), (UFAC 1589, 18.5 mm SVL) on 1997 in the Parque Nacional da Serra do Divisor – Giltarta, várzea (07°30'41" S, 73°36'23" W, 331 m), (UFAC 1819, 18.5 mm SVL) on 1997 in the Parque Nacional da Serra do Divisor – Lago do Zé Luiz (08°18'35" S, 73°17'50" W, 230 m) and (UFAC 2657, 12.4 mm SVL) on 1998 in the Parque Nacional da Serra do Divisor – Amônia River, Colocação Quieto (09°00'15" S, 72°51'28" W, 130 m). We reanalyzed that material and certified that those specimens actually correspond to *Pristimantis achuar* following diagnostic characteristics in Elmer and Cannatella (2008) in having two points at base of W are separate, absence of a canthal stripe, and presence of a pale venter. A lowland geographic distribution (between 239 - 255 masl) is also consistent with the Acre location. This record for Brazil extends the known geographic range of *P. achuar* to a point about 682 km northwest (straight line distance) from its type locality at Kapawi Jungle Lodge, Pastaza province, lowlands of the Pastaza and Napo river in southern Ecuador (Elmer and

Cannatella 2008) (Figure 1).

An amplexing pair of *Pristimantis delius* was encountered on 28 November 2012 at 19:37 h (UFAC 6038, male 21.7 mm SVL; UFAC 6039, female 24.3 mm SVL; Figure 2B) perched on a leaf at a height of 1.60 m above ground level in dense vegetation with abundant *Lepidocaryum tenue* (caranaí). We certified by examination of the material that specimens collected by Moisés Barbosa in Perú on 2001 (UFAC 3628, 21.3 mm SVL and UFAC 3629, 24.5 mm SVL) at Parque Nacional da Serra do Divisor – Contamana (07°06'57" S, 74°35'18" W, 250–400 m) and (UFAC 3579, 17.4 mm SVL) at Parque Nacional da Serra do Divisor – Tapiche (07°12'30"S, 73°56'04"W, 220–240 m) department of Ucayali, correspond to *Pristimantis delius.* The specimens coincide with diagnostic characteristic of Duellman and Lehr (2009) by lacking vomerine teeth and by having a dorsal pattern consisting of three brown longitudinal stripes on a tan ground color. This record for Brazil extends the known distribution range about 632 km from its type locality San Jacinto, Provincia de Loreto, in extreme northern Loreto Department, Perú (Duellman and Mendelson 1995) (Figure 1).

Three individuals of *Pristimantis orcus* were collected. The first (UFAC 6040, 37.5 mm SVL) was encountered on 28 November 2012 at 21:34 h perched on the leaf of *Lepidocaryum tenue* about 2.00 m off the ground in dense vegetation with abundant *Lepidocaryum tenue* (caranaí). The second record was an amplexing pair found on 1 December 2012 at 22:10 h (UFAC 6050, male 23.2 mm SVL; UFAC 6051, female 33.7 mm SVL; Figure 2C) perched at 1.96 m above ground level on a leaf of *Lepidocaryum tenue* in Campinarana Vegetation. The specimens have the diagnostic characteristics of a unique coloration pattern consisting of black with white or whitish blue blotches in axilla, groin, anterior and posterior surfaces of the thighs and concealed surfaces of the tibia and by its broad lateral fringes on fingers and toes, coinciding with Lehr *et al.* (2009). The first country record of *Pristimantis orcus* in Brazil extends its known geographic distribution by 485 km from its type locality Comunidad de Nueva Vida, Distrito de Trompeteros, Provincia de Loreto, Región Loreto, Peru (Lehr *et al.* 2009) (Figure 1).

Advertisement call of *Pristimantis orcus*

The vocalization of the specimen of *Pristimantis orcus* (UFAC 6050) were recorded with Nikon Coolpix100, it were edited and analysed with the software Praat v. 5.1.25; summary statistics were calculated with Statistic 7.

The following values are presented as: min-max (average ± SD, number of notes). The call of this species

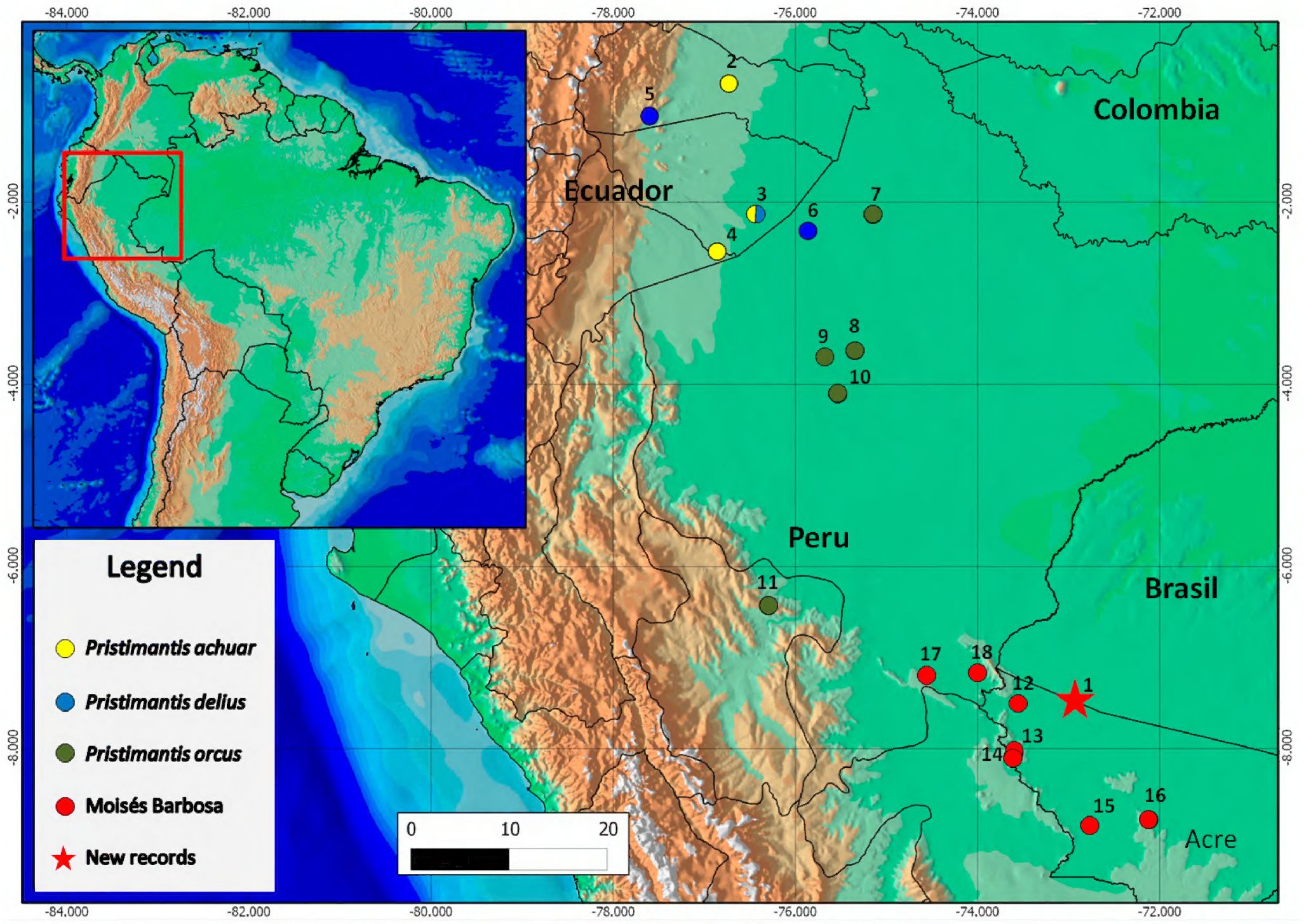

Figure 1. Map of new records (indicated by red star), localities of other works (indicated by dot), and localities serie for Moisés Barbosa (red dots) of *Pristimantis achuar* (yellow dot), *P. delius* (blue dot), and *P. orcus* (green dot). (1) New records (This work); (2) Orellana Province; (3) Juyuintza, Pastaza province; (4) Kapawi Jungle Lodge, Pastaza Province (type locality); (5) Napo Province; (6) San Jacinto, Provincia de Loreto (type locality); (7) Upper Panguana, Maynas Province; (8) Comunidad de Nueva Vida, Loreto Province (type locality); (9) Trompetero District; (10) Comunidad de Santa Rosa de Siamba, Urarinas District; (11) Cainarachi Valley, San Martin Province; (12) UFAC 1589, Giltarta, várzea; (13) UFAC 1819, Lago do Zé Luiz; (14) UFAC 2657, Amônia River, Colocação Quieto; (15) UFAC 892, Caminho Colocação Campos Elíseos ; (16) UFAC 4194, Tejó River Mouth; (17) UFAC 3628 and UFAC 3629, Contamana; (18) UFAC 3579, Tapiche.

consists of short pulsations regularly repeated (Figure 3) at intervals of 0.319 to 0.632 per second (0.424 ± 0.073, N = 52), with repetitions between 2 – 4 notes per second (2.899 ± 0.367, N = 49). Each note consist of 0.008 – 0.013 seconds (0.010 ± 1^{-3}, N = 20) and dominant frequency is between 1887.57 – 2285.28 Hz (2048.64 ± 105.40 Hz, N = 20).

Due to lack of information *(Pristimantis) unistrigatus species* Group vocalizations, we compare with the call of *Pristimantis ventrimarmoratus* presented by Lima (2012), in contrast to *Pristimantis orcus* has slightly longer pulsations (812 ms vs. 424 ms in *P. orcus*), with almost half of notes per second (1.225 vs 2.899 in *P. orcus*) and has a slightly high dominant frequency (2110.77 Hz vs. 2048 Hz in *P. orcus*). We identified the record as advertisement call based on the observed behavior. The amplexing pair was found perched on a leaf of *Lepidocaryum tenue* at 1.96 m above ground level. When placed into the plastic bag, they were separated and the male immediately began to vocalize with the goal of attract the female.

Figure 2. (A) *Pristimantis achuar* (UFAC 6052); (B) *Pristimantis delius* in amplexus (male: UFAC 6038, female: UFAC 6039); (C) *Pristimantis orcus* in amplexus (male: UFAC 6050, female: UFAC 6051) (photos from live individuals) in white sand forest, Mâncio Lima, Acre Brazil. Photos: J.J. López-Rojas.

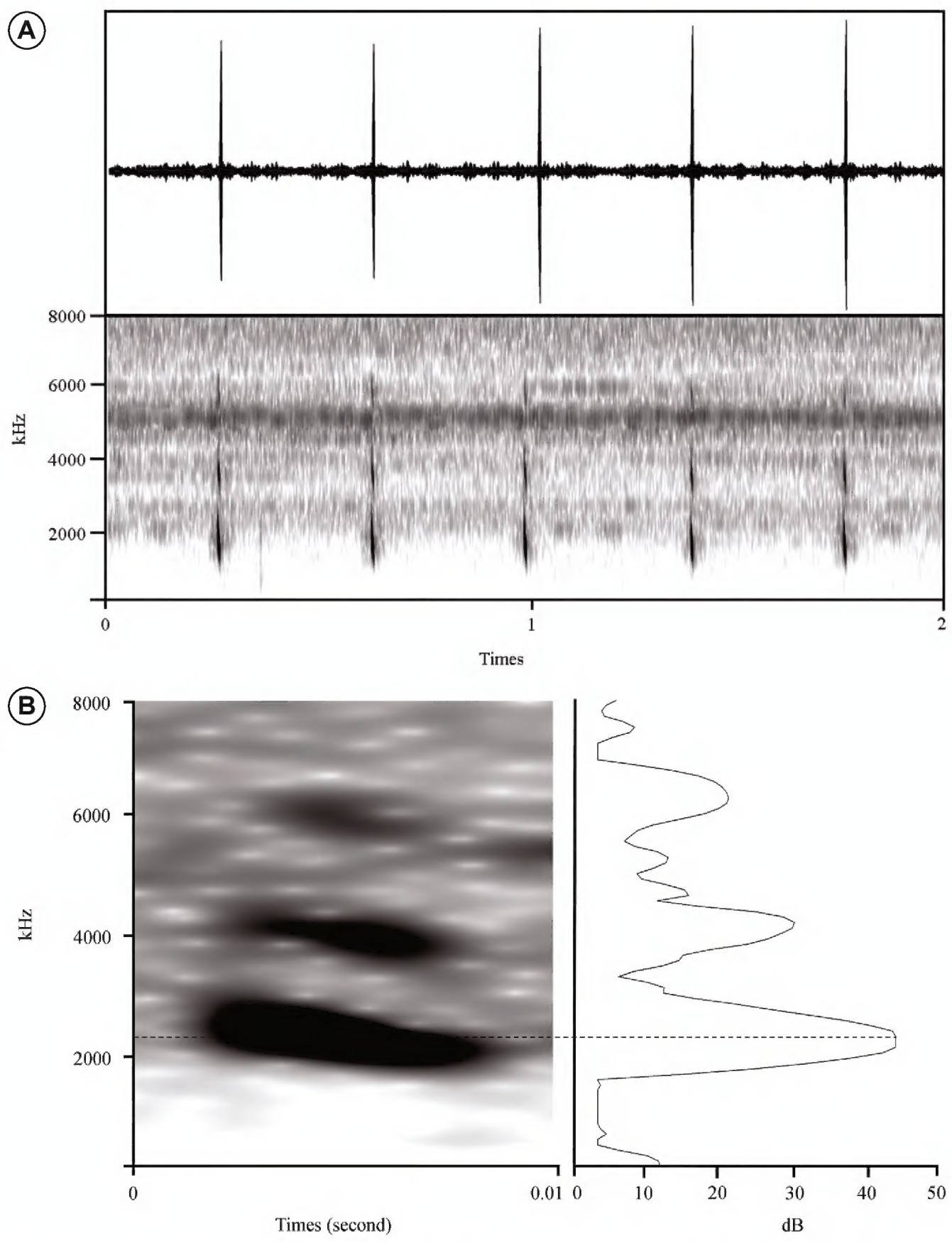

Figure 3. (A) Oscilogram (above) and audiospectrogram (below) of the advertisment call *Pristimantis orcus*. (B) Spectrogram showing amplitude modulation of one note. 01 December 2012 at 22:30 h at temperatures between 25.6 – 26.4°C, Mâncio Lima, Acre Brazil.

Acknowledgments: We are grateful to the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES), Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Programa de Pesquisa em Biodiversidade (PPBio), and Universidade Federal do Acre (UFAC), and to colleagues who assisted in field collections, Marcos Silveira and Elder Morato. Devon Graham, corrections and suggestions for the manuscript. Collection of specimens was authorized by Authorization System and Biodiversity Information (SISBIO, License no. 37974-1) to M. B. de Souza.

Literature Cited

Daly, D.C. and M. Silveira. 2008. *Flora do Acre, Brasil*. Rio Branco: EDUFAC. 555 p.

Duellman, W.E. 1978. The biology of an equatorial herpetofauna in Amazonian Ecuador. *Miscellaneous Publications, Museum of Natural History, University of Kansas, Lawrence* 65: 1-352.

Duellman, W.E. and J.R. Mendelson, III. 1995. Amphibians and reptiles from northern Departamento Loreto, Peru: Taxonomy and Biogeography. *University of Kansas Science Bulletin*, 55(10): 329-376.

Duellman, W.E. 1999. Distribution patterns of amphibians in South America; p. 255-328 *In* W.E. Duellman (ed.). *Patterns of distribution of amphibians: a global perspective.* Baltimore: John Hopkins University Press.

Duellman, W.E. and E. Lehr. 2009. *Terrestrial-Breeding Frogs (Strabomantidae) in Peru*. Münster: Naturund Tier-Verlag GmbH. 382 p.

Duellman, W.E. and R.A. Pyles. 1983. Acoustic resource partitioning in anuran communities. *Copeia* 1983(3): 639-649.

Elmer , K. and D. Cannatella. 2008. Three new species of leaflitter frogs from the upper Amazon forests: cryptic diversity within *Pristimantis* "ockendeni" (Anura: Strabomantidae) in Ecuador. *Zootaxa* 1784: 11-38.

Frost, D.R. 2013. *Amphibian species of the world: An online reference. Version 5.6* (9 January, 2013). Electronic Database accessible at http://research.amnh.org/herpetology/amphibia/index.html. Captured on 05 September 2012.

Hedges, S.B., W.E. Duellman and M.P. Heinicke. 2008. New World Direct-Developing Frogs (Anura: Terrarana): Molecular Phylogeny, Classification, Biogeography and Conservation, *Zootaxa*, 1737: 1-182.

Hedges, S.B. and A. Schluter. 1992. *Eleutherodactylus eurydactylus*, a New Species of Frog from Central Amazonian Perú (Anura: Leptodactylidae). *Copeia* 1992(4): 1002-1006.

Guayasamin, J. M. and C. Funk. 2009. The amphibian community at Yanayacu Biological Station, Ecuador, with a comparison of vertical microhabitat use among *Pristimantis* species and the description of a new species of the *Pristimantis myersi* group. *Zootaxa* 2220(2009): 41-66.

Lehr E., A. Catenazzi and D. Rodriguez. 2009. A new species of *Pristimantis* (Anura: Strabomantidae) from the Amazonian lowlands of northern Peru (Region Loreto and San Martín). *Zootaxa* 1990(2009): 30-40.

Lima, A.P., L.K. Erdtmann, M. Ferrão, J.M. Costeira, A.S. Oliveira, D.M. Oliveira. 2012. SAPOTECA: biblioteca de sons e vídeos de anuros amazônicos. CENBAM, Manaus, Amazonas, Brasil.

Lynch, J.D. and W.E. Duellman. 1980. The *Eleutherodactylus* of the Amazonian slopes of the Ecuadorian Andes (Anura: Leptodactylidae). *Miscellaneous Publications, Museum of Natural History, University of Kansas, Lawrence* 69: 1-86.

Ortega-Andrade, H.M. and Valencia, J.H. 2012. A new species of the *Pristimantis* frater group (Anura: Strabomantidae) from the eastern evergreen Lowland Forests of Ecuador. *Herpetologica* 68 (2): 244-255.

Rodríguez, L., J. Martinez, J. Icochea and A. Angulo. 2004. *Pristimantis delius*. *In* IUCN 2012. *IUCN Red List of Threatened Species. Version 2012. 2*. Electronic Database Accessible at www.iucnredlist.org Captured on 21 December 2012.

Segalla, M.V., U. Caramaschi, C.A.G. Cruz, P.C.A. Garcia, T. Grant, C.F.B. Haddad and J. Langone. 2012. *Brazilian amphibians-List of species*. Electronic Database Accessible at http://www.sbherpetologia.org.br. Captured on 30 November 2012.

Souza, M.B. 2009. *Anfíbios: Reserva Extrativista do Alto Juruá e Parque Nacional da Serra do Divisor, Acre.* Campinas: IFCH. 77 p.

Toft, C.A. 1985. Resource partitioning in amphibians and reptiles. *Copeia* 1(1985): 1-21.

Yañez-Muñoz, M. and P. Venegas. 2007. Amphibians and reptiles, Appendix 4; p. 90-96. *In* W. Alverson, C. Vriesendorp, J.A. Álvarez, N. Barbagelata, W.S. Anderson and D.K. Moskovits (ed.). *Ecuador-Perú: Cubayeno - Güeppi. Rapid Biological and Social Inventories Report 20.* Chicago: The Field Museum.

Received: April 2013
Accepted: October 2013
Published online: December 2013
Editorial responsibility: Fernanda P. Werneck